50. (previously presented) A device for detecting ionizing radiation, comprising:

electrodes, wherein said electrodes are composed of silicon wafers having prefabricated pulse detection circuitry patterned thereon;

the material of claim 1 disposed between said electrodes; and

power supply means for providing power to said electrodes.

51. (previously presented) A method for detecting ionizing radiation, comprising:

providing an array of wires embedded in the material of claim 1, the array comprising a first set of parallel spaced apart wires intersecting orthogonally with a second set of parallel spaced apart wires;

supplying electric power to the array;

inserting the array into a radiation field; and

detecting the signal generated when radiation strikes the wires.

52. (previously presented) The method of claim 51, wherein the array is a multilayer array.

REMARKS

Claims 1-52 were presented for examination all claims were rejected.

Claim 47 has been amended, consistent with the specification, to more clearly define the invention.

Applicant expresses appreciation for the entry of claims 50-52 into the record.

Objection

Claim 47 is objected to as an improper dependency. With the amendment to claim 47, Applicant urges that the objection has been cured and requests reconsideration and withdrawal of the objection.

Rejection under 35 USC 112

Claims 47 and 48 are rejected under 35 USC 112, second paragraph as being indefinite because of the wording of the multiple dependency claimed in claim 47. Claim 47 has been amended to reflect the wording of MPEP §608.01(n). With the amendment to claim 47, Applicant urges that the rejection has been cured and requests reconsideration and withdrawal of the rejection of claim 47.

Claim 48 was rejected as being dependent upon a rejected claim (claim 47). With the amendment to claim 47, the rejection of claim 48 has been cured and requests reconsideration and withdrawal of the rejection of claim 48.

Rejection under 35 USC 102

Claims 1, 3, 7, 12-15, 18, 24-26, 29, 35-39, 42, 47, 48, 51 and 52 are rejected under 35 USC 102(e) as being anticipated by Bardash (6,278,117). Applicant traverses the rejection.

Claim 1 clearly recites, *inter alia,* that the claimed solid organic semiconducting material consists essentially of a π-conjugated material having an electrical resistivity of at least 10^9 ohm-cm. Rejection is based upon Examiner's assertion that Bardash discloses the invention claimed in base claim 1. However, by Examiner's admission Bardash does not disclose the claimed electrical resistivity of at least 10^9 ohm-cm. In an attempt to remedy this discrepancy Examiner states that it is well known that the polythiophene used by Bardash has an electrical resistivity of at least 10^9 ohm-cm. In support of this assertion Examiner cites Applicant's disclosure. In fact, Applicant states "Because of their high resistivities (>10^9 ohm-cm) π-conjugated polymers, and particularly such π-conjugated polymers as polypyrrole, di-octyloxypolyparaphenylenevinylene and poly-3-octyl thiophene, can function as radiation detection materials that exhibit very low leakage currents. Contrary to Examiner's assertion,

nowhere does Applicant disclose, suggest or teach that polythiophene possesses the claimed electrical resistivity of at least 10^9 ohm-cm; poly-3-octyl thiophene is not polythiophene and the properties possessed by the former cannot be inferred to be possessed by the latter without further support. Examiner's statement that the failure of Bardash to explicitly disclose the claimed limitation because it is well-known in the art is without foundation. Moreover, because of the manner in which Bardash constructs his detector; "the present invention arranges microstructures in a particular geometry that reduces the capacitance and noise associated with large capacitance." (col. 2, 37-55), he neither suggests nor teaches that his polymer material possess any specific resistivity because, as the foregoing quotation indicates it is unnecessary. All he requires is that the organic material have a density very close to that of normal tissue (col. 2, 37-40) and have a chemical composition similar to tissue carbohydrates, consisting essentially of carbon, hydrogen and oxygen (col. 4, 10-20). Bardash clearly fails to anticipate the claimed invention since *prima facie* anticipation requires that there be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. Based on the argument above, Applicant requests reconsideration and withdrawal of the rejection of claim 1.

Insofar as claims 3 and 7, dependent from claim 1, claim 3 further limits the recitation of claim 1 to π-conjugated polymers, polyaromatic hydrocarbons, or quinolates, none of which applies to polythiophene which, as reference to any elementary organic chemistry would disclose, is a heterocyclic compound unrelated to the recitations of claim 3. Claim 7 further limits claim 1 to polyaromatic hydrocarbons, which are again unrelated to the polythiophene of Bardash. The rejection of claims 3 and

7 under 35 USC §102 is clearly misapplied and Applicant requests reconsideration and withdrawal.

Claim 24, and claims 25-29 depending therefrom, claims a device for detecting low energy neutron radiation, comprising, in part, electrodes; the π-conjugated material of claim 1 disposed between the electrodes, the electrodes disposed on the surface of the solid organic semiconducting material as a single layer; and power supply means. Bardash teaches a tissue equivalent solid state detector comprising 1) a polymeric substrate having on its surface 2) a metallic binder layer and 3) a metallic electrode contacting the metallic binding, wherein the metallic electrode layer is embedded in the active polymer layer. The word embedded is defined as "to fix into a surrounding mass" (The Random House College Dictionary, 1st ed., 1980). Clearly, electrodes cannot be disposed on the surface of the solid organic material, as claimed, and at the same time be embedded as described by Bardash. The rejection of claims 24-29 is certainly misapplied and Applicant requests reconsideration and withdrawal of the rejection.

Claim 35 and claims 36-38 depending therefrom, claims a device for detecting ionizing radiation, comprising: an array of wires embedded in a π-conjugated material, the array comprises a first set of parallel spaced apart wires intersecting orthogonally with a second set of parallel spaced apart wires; and means for supplying power to the array. Bardash, as cited by Examiner, discloses two arrays of interdigitated conductor lines, wherein the separation between the two wires is about 2 mm and the separation between two conductors on either of the interdigitated conductor lines is on the order of 20 μm (col. 3, 43-63). Referring to the cited figure (Figure 2 of Bardash) as well as the dictionary shows that the word "interdigitated" means "interlocking, as in the fingers of both hands" (The Random House College Dictionary, 1st ed., 1980). On the

other hand, referring now to figure 2 of the specification as well as the dictionary we find that the word orthogonal (cf. claim 35) means "pertaining to or involving right angles or perpendiculars" (The Random House College Dictionary, 1st ed., 1980). Clearly, the recitation of claim 35 has been misconstrued. The instant invention and Bardash are directed to two entirely different geometries, the rejection of claim 35 is misapplied and Applicant requests reconsideration and withdrawal of the rejection.

Claim 42 claims a method for detecting ionizing radiation in which a device comprising a π-conjugated polymer having an electrical resistivity of at least 10^9 ohm-cm disposed between a pair of compositionally alike electrodes is exposed to ionizing radiation. Rejection is based on Examiner's assertion that while Bardash does not disclose the use of a polymer having an electrical resistivity of at least 10^9 ohm-cm this deficiency is overcome by the knowledge that polythiophene, used by Bardash, has an electrical resistivity of at least 1 gigaohm as disclosed by Applicant. The argument overcoming the rejection to claim 1 applies equally here. Bardash clearly does not anticipate claim 42 and Applicant requests reconsideration and withdrawal of the rejection of claim 42.

Claim 47, and claim 48 dependent therefrom, recite that the polymer material of the invention is <u>stretched</u> to apply an external stress thereby straining and orienting the polymer chains. Bardash is cited for orienting the polymer molecules by the application of a voltage. While the technique used by Bardash, application of a voltage to a polymer material, may cause the polymer molecules to line up in a preferred orientation that is not what is claimed in claim 47 of the instant invention. It is well settled that for a rejection for anticipation to be viable there must be no difference between the claimed invention and the reference

disclose as viewed by one of ordinary skill in the art; stretching a polymer is not the same physical act as applying a voltage. The rejection has clearly been misapplied and Applicant request reconsideration and withdrawal.

Claims 51 and 52, dependent therefrom, are drawn to a method for detecting ionizing radiation, wherein an array of wires comprising a first set of parallel spaced apart wires intersecting orthogonally with a second set of parallel spaced apart wires and embedded in a polymer material having a resistivity of at least 10^9 ohm-cm is provided and the array is inserted into a radiation field. The array can be a multilayer array (claim 52). Rejection is based on the assertion that Bardash discloses the claimed device and method. The argument set forth for claims 37 and 38 above applies equally here. The rejection is misapplied and Applicant requests reconsideration and withdrawal of the rejection of claims 51 and 52.

Claims 1-3, 7, 8 and 9 are rejected under 35 USC §102(b) as being anticipated by Snavely (3,849,345). Applicant traverses the rejection.

Snavely teaches a method for preparing semiconducting articles incorporating rubbery copolymers and normally non-conductive carbon black (col. 2, 1-15). The instant invention neither claims nor contemplates the combination of a polymer material and carbon black. The object in Snavely is to improve the conductivity of the polymer material by the addition of carbon black an object that is diametrically opposed to that of the claimed invention, which is a high resistivity (low conductivity) polymer material (claim 1 and p. 5, 1-5). The rejection of the claims as being anticipated by Snavely is clearly misapplied and Applicant requests reconsideration and withdrawal of the rejection.

Rejection under 35 USC §103

Claims 2, 8, 9, 19, 20, 30 and 31 are rejected under 35 USC 103(a) over Bardash (6,278,117) in view of Butler (4,641,037), Selph (4,445,036) and Snavely (3,849,345). Applicant traverses the rejection.

The rejected claims recite that the π-conjugated material comprises a mixture of π-conjugated materials (claim 2), that the π-conjugated polymers are mixed with organic polymers (claims 8, 19 and 30) and that the organic polymers include polystyrene or poly(methylmethacrylate) (claims 9, 20 and 31). By Examiner's admission, nowhere does Bardash teach, disclose or even suggest that his polymer material be mixed with anything including other π-conjugated material (claim 2) or organic polymers (claims 8, 9, 19, 20, 30 and 31). However, Examiner asserts that that deficiency is overcome by looking to the other cited references. But since Bardash neither discloses nor teaches mixing his polymer material with other π-conjugated material or organic polymers there is no suggestion or motivation to look to other references except for that provided by the instant invention. Thus, combining Bardash with the other cited references as Examiner has done requires impermissibly using the invention as a blueprint.

It is well settled that hindsight reconstruction cannot be used to pick and chose among isolated disclosures in the prior art to deprecate the invention. *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1780,1783 (Fed Cir. 1988). Combining prior art references without evidence of a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability-the essence of hindsight, *In re Dembiczak*, 175 F.3d 994, 999 50 USPQ 1614, 1617 (Fed. Cir. 1999), which Applicant urges is the case here. Moreover, "Broad conclusory statements regarding the teachings of multiple references, standing alone, are not evidence" (ibid. at 1617).

On the basis of the argument above, Applicant requests reconsideration and withdrawal of the rejection.

Claims 5, 6, 16, 17, 27 and 28 are rejected as above. Applicant traverses the rejection.

Claims 5, 16 and 27 recite, *inter alia*, that the π-conjugated polymer material of the invention is selected from any of polyacetylenes, polypyrroles, polyfluorines, and derivatives and combinations thereof.

In rejecting the above-referenced claims, Examiner states that Bardash discloses everything as above except for the claimed polypyrroles and/or polyacetylenes. Therefore, because the polythiophene, used by Bardash, and polypyrroles and polyacetylenes are art-recognized equivalents, as evidenced by Selph ('036) it would be obvious to substitute one for the other. In the first place, this is a mischaracterization of Bardash. As Applicant has shown above, Bardash only states that his polymeric layer be fashioned from polymeric material having a chemical composition similar to tissue carbohydrates. He is silent about electrical properties (e.g., resistivity). Except for searching for a polymer material having a chemical composition similar to tissue carbohydrates, there is neither suggestion nor teaching in Bardash that would lead or motivate a person of ordinary skill in the art to the cited references, which apparently are cited only because of their equivalent resistivity properties. It is obvious that the combination of Bardash and the references cited above to reject the claims requires the impermissible use of hindsight. Therefore, Applicant urges that a *prima facie* case of obviousness has not been made and requests reconsideration and withdrawal of the rejection. Moreover, Applicant notes that the above-referenced claims include polyfluorines, a polymer material not disclosed in any of the cited references.

Claims 6, 17 and 28 recite that the derivative π-conjugated polymer material is selected from any of poly(1-methoxy-4-(2-ethylhexyloxy)-2,5-phenylenevinylene), poly(2,5-dioctyloxy-p-phenylenevinylene), poly(3,4-ethylene dioxythiophene), and poly(3-octylthiophene), and combinations thereof none of which are either taught or suggested by any of the cited references. Therefore, Applicant urges that the rejection claims 6, 17 and 28 is misapplied and requests reconsideration and withdrawal.

Claims 10, 22, 33 and 41 are rejected as unpatentable over Bardash in view of Butler. Applicant traverses the rejection.

By Examiner's own admission there is no suggestion that a metal be incorporated into the π-conjugated polymer structure as claimed. Consequently, except for using Applicant's invention as a blueprint there is neither suggestion nor motivation in Bardash to look to Butler. Since the combination Bardash with the other cited references must, of necessity, required impermissibly using the invention as a blueprint a *prima facie* case of obviousness has not been made and Applicant requests reconsideration and withdrawal of the rejection of claims 10, 22 and 33.

Insofar as claim 41, which claims a method for detecting fission neutrons, wherein a device comprising a π-conjugated material having an electrical resistivity of at least 10^9 ohm-cm is disposed between a pair of compositionally alike electrodes, having power applied thereto, is exposed to a neutron flux by Examiner's admission Bardash is silent about the claimed π-conjugated material having an electrical resistivity of at least 10^9 ohm-cm. Examiner again attempts to overcome this deficiency by looking to Applicant. As Applicant has argued above, contrary to Examiner's assertion nowhere does Applicant disclose, suggest or teach that polythiophene possesses the claimed electrical resistivity of at least 10^9 ohm-cm. Examiner's statement that the failure of Bardash to

explicitly disclose the claimed limitation because it is well known in the art is without foundation. Therefore, Applicant requests reconsideration and allowance of claim 41.

Claims 11, 23 and 34 are rejected as unpatentable over Bardash, in view of Butler and Smith (3,824,220). Applicant traverses the rejection.

Dependent claims 11, 23 and 34 claim the incorporation of a metal into the π-conjugated material of the invention, wherein the metal is aluminum, gallium, boron or lithium. Bardash claims in the cited reference (claims 10, 22 and 33) metallic binder layer deposited onto a polymeric substrate. The metallic binder layer is provided for electrical contact between the metallic electrode layer embedded in the polymeric substrate and a source of electrical potential, i.e., metal contacts (col. 2, 55-67). The rejected claims of the instant invention plainly recite that a metal is incorporated into the structure of the π-conjugated material of the invention and is provided to enhance the ability of the semiconducting polymer to detect specific radiation (p. 10, 17-25). The rejection is without foundation and Applicant requests reconsideration and withdrawal.

Claim 40 is rejected as unpatentable over Hodges (6,174,420) and Heffelfinger (3,048,564). Applicant traverses the rejection.

Hodges is directed to a thin-layer electrochemical cell and the manufacture thereof. Hodges cell consists of an electrically resistive sheet having an aperture therethrough, thin electrodes on either side of the electrically resistive sheet defining a cell therebetween, wherein the electrodes are conductors or semiconductors. In a preferred embodiment, the aperture is of a circular cross-section. Contrary to Examiner's express representation, nowhere does Hodges teach, show or disclose the embodiment of the invention disclosed in claim 40, namely a device for detecting ionizing radiation in which the solid organic semiconducting

material of the invention is disposed between said electrodes and the combination of electrodes and π-conjugated polymer is rolled up along their length to form a generally cylindrical-shape structure. In support of his rejection Examiner cites Fig. 15 of Hodges. In the referenced figure Hodges shows a plurality of flat planar electrode structures surrounding a central aperture cell. Nowhere does Hodges show or teach the claimed structure comprising electrodes, and a solid organic semiconducting material consisting essentially of a π-conjugated material having an electrical resistivity of at least 10^9 ohm-cm rolled up along its length to form a generally cylindrical-shape structure. The addition of Heffelfinger to Hodges does not save the rejection.

Based on the argument above, the rejection of claim 40 as unpatentable over Hodges is clearly misapplied and Applicant requests reconsideration and withdrawal of the rejection of claim 40.

Claim 50 is rejected as unpatentable over Bardash and Robinson (5,500,534). Applicant traverses the rejection.

Claim 50 teaches a device for detecting ionizing radiation in which the material of claim 1 is disposed between electrodes are composed of silicon wafers having prefabricated pulse detection circuitry patterned thereon.

Bardash, in a preferred embodiment cited by Examiner, shows in cross section through an array in FIG. 1, 1) a metallic electrode layer 3 contacting 2) a metallic binder layer 5 and 3) an active polymeric layer 7 cast onto a polymeric substrate 9, so that the metallic electrode layer is embedded in the active polymeric layer 7. A top view of the array is shown in FIG. 2, looking downward through the active polymeric layer. The metallic electrode layer 3 is shown in greater detail in FIG. 3 of Bardash and consists of at least two arrays of interdigitated conductor lines 15 and 17, each leading to one of two respective wire legs 19 and

21, such that there is a small capacitance between the pair of wires (col. 3, 40-45). Thus, Bardash's electrode consists of two arrays of interdigitated conductor lines contacting a metallic binder layer. Bardash neither teaches nor suggests the claimed prefabricated pulse detection circuitry. Furthermore, by Examiner's admission Bardash does not teach the use of a silicon as a substrate for the pulse detection circuit. In attempting to overcome this discrepancy Examiner looks to Robinson ('534). However, since Bardash neither teaches nor suggests the need or desirability for other than the gold electrode material he uses (col. 10, 10-40) there is no suggestion or motivation in Bardash to look to Robinson. It is obvious from the argument above that impermissible hindsight was used to combine references and reject claim 50. On this basis, Applicant requests reconsideration and withdrawal of the rejection of claim 50.

CONCLUSION

Applicant having overcome the rejections of claims 47 and 48 under 35 USC §112, second paragraph, the rejection of claims under 35 USC §102 and 35 USC §103 now requests withdrawal of the rejections and that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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